UNIVERSITY OF ILLINOIS
Agricultural Experiment Station

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ABSTRACT OF THE PROCEEDINGS OF THE CONFERENCE ON ANIMAL TUBERCULOSIS AT THE UNIVERSITY OF ILLINOIS, OCTOBER 15, 1908

Introduction

Some months ago it became evident that tuberculosis is developing at an alarming rate among cattle and swine in certain portions of Illinois. This fact, together with the widespread interest in the general subject following inevitably upon the International Congress on Tuberculosis at Washington, D. C., convinced the University authorities that the time had come for a serious consideration of this perplexing question, looking to concerted action on the part of the live stock men of the state for the checking of this disease before it becomes more widely prevalent.

This action was impelled by another consideration, namely, the possible communication of this disease from animals to man, a consideration certain to arouse public boards of health and, possibly, lead to legislation of very serious consequences to live stock interests.

Wholly aside from considerations of human health, however, the disease is a sufficient menace to the live stock interests to warrant the most persistent efforts for its eradication and if this could be accomplished by the live stock men in their own interest, then many troublesome complications could be avoided as between the interests of the live stock people upon the one side and the considerations of public health upon the other.

Accordingly, this Conference was called solely for the consideration of animal tuberculosis. Live stock people generally were invited and every means afforded to make the discussions both practicable and reliable.

The Authorities Present

Upon inviting the live stock men into this Conference, the University took the precaution to have present the most reliable authorities available upon this general subject. Three of its own best people had been in attendance throughout the Washington International Congress already alluded to, and besides these there were specially invited three of the foremost authorities in the world on the general subject of bovine tuberculosis and its control. These latter were present, as follows:

1. Dr. Bernard Bang, Professor of Pathology and Therapeutics, and Director of the Royal Veterinary School, Copenhagen, Denmark, who has had more than twenty-five years' experience in the practical treatment of this disease in his own country and who is the originator of the famous Bang method, approved everywhere as the most rational mode of procedure with infected herds.

2. Dr. Leonard Pearson, Dean of the College of Veterinary Science, University of Pennsylvania, one of the very foremost authorities on this subject in this country from the veterinarian's standpoint, and in direct charge of tuberculosis control in his own state.

3. Dr. H. L. Russell, Dean of the College of Agriculture, University of Wisconsin, a bacteriologist of international reputation, who has for more than ten years been conducting original research in the general subject and who has been the leading factor in the west for the control of this disease.

It would not have been possible to assemble for the consideration of this subject more representative authority than was here gathered together. In brief, there was in this Conference sufficient of the highest authority to represent fully the world's knowledge today upon this most troublesome question.

Program

The program consisted of formal addresses by each of the eminent gentlemen from other institutions, at home and abroad, followed by the most informal discussion, covering every conceivable

phase of the subject, and before the end of the two days it appeared that the matter in substantially all its bearings had been thoroughly canvassed.

The afternoon of the second day was given to the slaughter and clinical examination of three cows that had reacted to the test, only one of which gave the slightest outside indication of any disorder of any kind. This was limited to a lump in the throat. In all three cases, and in six other animals, all in good flesh, which were slaughtered the following day, the disease was readily found in gland or lung tissue.

The Purpose of This Circular

Stenographic reports of this Conference containing the addresses and discussions have been published in limited numbers and may be had upon application. The matter is voluminous and not well adapted to widespread circulation. The purpose of this circular is to give in brief form the widest circulation possible, the chief points developed in the Conference, particularly those that are of special interest to the live stock people concerned with the control of this disease.

Authority for Statements Contained Herein

It should be clearly understood that in issuing this circular, the University of Illinois is not reporting its own investigations or giving its own opinions. No general researches in this subject have been carried on at this institution and the purpose of this circular is solely to reflect the attitude of the authorities in attendance upon the Conference and to record for the convenience of Illinois stockmen in the briefest possible space the present state of knowledge as held by the most eminent authorities. The disease has been under more or less careful investigation for more than a quarter of a century and the last dozen years have added greatly to our knowledge of its nature and especially to the methods for its control.

After observing the care that the University did observe in the authorities it invited to this Conference, the institution feels that it can render no better service to the live stock interests of this state and the public generally than by giving the widest possible circulation to the essential points involved in the discussions of the Conference.

SIGNIFICANT POINTS IN THE CONTROL OF ANIMAL TUBERCULOSIS

Nature of the Disease

Tuberculosis is a germ disease. The disease does not "develop" because of bad surroundings, unless the specific germ is present, and if the germ be present the disease will progress even in the midst of the best surroundings. The bacillus of tuberculosis is a microscopic plant, able to live and multiply in a great variety of animal tissues. It can live in any portion of the body. It is found most commonly in the glands and soft tissues of the internal parts, especially the lungs, but it attacks also the joints, bones, and even the brain. Indeed, there is no part of the body exempt from its infection.

The injury to the animal by this disease is two-fold:

First, the organism produces in its growth certain poisonous compounds, so-called toxins, which exert a deleterious effect upon the strength and health of the animal; in general in proportion to the extent of the disease.

Second, if a vital organ happens to be the seat of the infection death may ensue by the destruction of the organ through the breaking down of tissue which always attends the rapid progress of this disease.

In the vast majority of cases, the disease develops slowly and while the animal commonly does not recover, yet it may live for years and be a useful member of the herd; indeed it may die of old age; however, any case may at any time become generalized and develop without warning into "galloping tuberculosis" or "quick consumption."

The bacillus attacks and flourishes more or less successfully in a great number of widely different species. Three pronounced types are known and somewhat clearly differentiated: first, the bovine or cattle type, which attacks also pigs and other quadrupeds; second, the avian or bird type which attacks poultry; third, the human type, which is also extremely fatal to monkeys. Horses, sheep and dogs are seldom attacked by any one of these types; indeed, they are well nigh though not completely immune. Wild animals in captivity are sometimes tuberculous, though the type has not been much studied. Besides these, there are a variety of types of pseudo or false tuberculosis, not yet well understood.

The three types mentioned, bovine, avian and human, are the three that concern man, and the purpose of this circular is to deal particularly with the bovine type.

Manner of Dissemination

The dissemination of this disease is wholly from animals so seriously affected as to be shedding the germs. Such cases are said to have "open tuberculosis." Whatever the extent of the infection, or however seriously the animal itself may be suffering, it is not a disseminator of the disease until the tissues begin to break down and the organisms begin to escape from its body. The uncertainty of knowing either the location or the extent of the disease makes it practically impossible in most cases to tell whether or not a particular animal has "open tuberculosis" and is disseminating the disease. This being true all diseased animals are dangerous as being possible sources of infection.

Cattle for the most part swallow their own sputum, yet in advanced cases of pulmonary tuberculosis considerable amounts are thrown off. Smeared mangers and drinking troughs are serious sources of infection, and the licking of the calf by its affected dam is likely to spread the infected material.

Another common source of contamination is the feces from diseased animals. If the case is an intestinal one, when it reaches the breaking down stage large numbers of bacilli are shed, and swine and rats running in the yard are easily infected from this source.

A third source of infection is the milk, which can carry the bacilli from two sources: first, practically all of the sediment in milk produced in filthy stables is cow dung, and it is perfectly clear that if these contain the bacilli, they will get into the milk; second, the udder itself may become tuberculous, leading to a free and direct contamination of the milk. This may be periodic and not constant. That is to say, germs are shed only when tissues are breaking down, but the impossibility of knowing when this takes place in the udder makes all animals with infected udders extremely dangerous.

Still another wholesale means of disseminating this disease is the "dispersion sale," for if the disease is present in the dispersed herd, it is literally scattered broadcast where it will do the most harm possible, for the animals are bought by ones and by twos by the most progressive stockmen for the purpose of improvement.

The most wholesale and dangerous means of infection is the unheated mixed skim milk and whey from creameries and cheese factories.

Another wholesale source of infection of swine comes from the atrocious habit of allowing offal and dead animals of all kinds to be consumed by hogs. The pig is exceedingly susceptible to this

disease—even one dose of highly tuberculous milk being sufficient to thoroughly infect this animal. The best evidence upon this point is that nearly all slaughter house rats and hogs are tuberculous.

Infection from the cow to the pig through skim milk is direct and free. It is easy to see why the tuberculosis of swine is distinctly of the bovine type. There is, however, little opportunity for infection from swine to cattle so that the disease practically never travels backward between these species.

Susceptibility to Infection

All experiments indicate that small numbers of bacilli taken but once or at infrequent intervals do not commonly infect; that is, that all individuals have a considerable degree of resisting power to the invasion of disease germs. On the other hand, repeated doses will finally infect, for probably no individual is completely immune to the disease.

The young of all species are much more susceptible to tuberculosis than are the mature individuals of the same species. Illness from other causes and weak conditions generally are all favorable to easy infection, and, in general, herds subjected to repeated injestion of the organism may finally as a whole succumb to the disease.

Points of Infection

Infectious material may be taken in either through the nostrils or through the mouth—more commonly through the latter. Mixed with the food or drink, on the mangers and feeding floors such material will be readily taken by the animal, in which case the attack may be upon the digestive tract or the glands near by. Any infectious material which becomes dry or pulverized and blown about as dust may be taken through the nostrils, in which case the primary infection is likely to be the lungs.

In some cases the infected spots may become "encysted," that is, enclosed by tough and impenetrable growth in the form of round nodules, giving the characteristic name of the disease—tuberculosis, from the little tubercles or nodules commonly formed. In such cases the bacilli are confined, and the disease is called "closed."

In other cases, however, no nodules are formed. The progress of the disease is rapid, the spots corrode and the germs may make their way into the blood and over the general system, giving rise to what is sometimes called "galloping tuberculosis," rapidly ending in death.

Clearly, infection comes from those cases in which the tissues are breaking down and the bacilli are shed from the animal body in one form or another.

Detection of the Disease

In a few cases the disease so thoroughly affects the animal as to give rise to easily discerned symptoms, such as extreme emaciation, external abscesses, etc. In these cases, the animal is evidently diseased and would be destroyed on general principles. In the vast majority of cases, however, little or no external indication is given of the presence of tuberculosis. The disease does not, like anthrax, hog cholera, foot and mouth disease, etc., proceed rapidly. On the contrary, it is slow and insidious in its movement, sometimes said to be "corrosive" rather than "eruptive." It is chronic rather than acute, and in this fact lies its chief danger, for because of this, the stockman may keep it upon his premises for years before it is clearly evident, by which time it has undermined the entire herd.

The disease is not hereditary, except as the individual may inherit from one or both parents a feeble constitution with low resisting powers. That is to say, tuberculous parents may bear perfectly healthy offsprings and they will not contract the disease unless they have been subjected to infection after birth.

The only exception to this statement lies in the fact that the uterus is sometimes tuberculous, in which case the young will be infected by contact before birth and will be born with the disease. This, however, is a case of pre-natal infection rather than of heredity. The case is a very rare one, but it occasionally occurs.

The Tuberculin Test

The insidious nature of the disease and the amount of infectious material which mature and healthy animals can stand without apparent suffering made tuberculosis in the past almost impossible of detection except in its advanced stages. The tuberculin test, therefore, is a godsend to the stockman. It consists in injecting under the skin of the animal, generally in the region of the shoulder, about a small teaspoonful of "tuberculin" which is the liquid in which the germs of tuberculosis have been artificially grown in the laboratory, but which has afterward been sterilized by heating and filtering.

If the animal is free from infection, no result will follow the injection of the tuberculin, but if it is infected the injection will be followed in from eight to twenty-four hours by a distinct rise of temperature anywhere from two to six degrees, Fahrenheit.

Not all tuberculin is good. If not good, it will be inert and no reaction will follow, even though the animal is diseased. A re-

liable supply can now be had from the Bureau of Animal Industry, Washington, D. C., as also from various manufacturing chemists.

If the tuberculin is good, it constitutes a reliable test for the presence of this disease, because thousands of reacting animals have been destroyed, often without the slightest surface indication of disease, but invariably the infection is found somewhere in the animal,—accurately speaking, in over 98 percent of the cases it has been located.

The tuberculin test does not distinguish between severe and slight cases, nor does it distinguish between those that are shedding infection and those which are not inconvenienced by the disease and are not infecting their neighbors. It is so delicate that extremely slight infection will cause the animal to react, even though, as in some cases, the disease is limited to a very small area, perhaps in the brain or some remote portion of the bony structure of the body. In one case the disease was not found until the skeleton was cleaned for mounting, but all authorities agree that the tuberculin test is a reliable test of the presence or absence of the disease.

Tuberculin itself, when properly prepared, is not infectious, and there is no possibility of bringing on the disease by subjecting animals to the tuberculin test. That is to say, testing the herd does not develop the disease, nor are repeated tests at all injurious to healthy animals. On the contrary, repeated tests upon infected animals tend slightly to aggravate the disease so that on general principles when an animal is once found to be tuberculous, it is better not to repeat the test. Repetition of the test upon reacting animals is unnecessary, because their recovery is rarely, if ever, completely effected. Human beings seem to be more resistant to tuberculosis than are cattle or swine and much more able to combat and conquer the disease than are these animals, which if once infected, may as well be considered tuberculous ever after.

Reliability of the Test

The tuberculin test, where properly applied by competent persons, is an absolute guide to the presence of bovine tuberculosis, except for two particulars. First, if the infection is *exceedingly recent* the animal will not react because the disease is not sufficiently developed; second, if the disease has progressed to its *last stages* the animal has become accustomed to toxic poisoning, and will not react. This being true, some of the worst cases may pass the test and remain in the herd as dangerous sources of infection afterward. These, however, can usually be detected by external signs of disease.

Treatment of an Infected Herd

If a herd has been tested for tuberculosis and found infected, the first thing to do is to separate the reacting from the non-reacting animals, maintaining thereafter, so long as the infected animals remain, two herds upon the farm. This is the so-called "Bang system," now generally recognized as the best practical method of procedure. This separation may be in different buildings, but so slight a separation as a board partition across the barn has been found effective, the diseased and healthy animals being kept in the same building but attended by different workmen or else by the same workmen, after a change of clothing.

The next step is thorough disinfection of the premises for the sake of both herds to the end that the healthy herd shall not become infected and that the infected herd shall have as little additional infection as possible.

Disinfection

The best disinfectant is sunlight, a few hours of which will destroy naked tuberculosis germs, a fact which makes pastures harmless after diseased animals have been removed for a few days. Portions of buildings and their surroundings that cannot be subjected to direct sunlight should be thoroughly cleaned of all litter and liberally treated with some good disinfectant like corrosive sublimate, 1 part to 1000 parts of water=¼lb. to 30 gals. It is important that this work should be well done and that the disinfecting material should get into all the cracks and crevices where infectious material might lurk. For thoroughness' sake this should be done two or three times for the healthy herd and should be constantly repeated in the diseased herd in the interest of reducing infection there.

After treatment by the disinfectant, the inside of the barn should be thoroughly sprayed with milk of lime white wash, which makes a coating over everything and tends to prevent dissemination in the form of dust.

Subsequent Treatment of the Healthy Herd

The test will need to be repeated upon this herd every six months for a time, because of the incipient cases not sufficiently advanced to be detected by the first test, and which will remain unnoticed until the disease has proceeded sufficiently to react. The finding of such additional reaction in subsequent tests is what has given a widespread impression that tuberculin is sometimes a cause of the disease, but it is evident that if a large portion of a herd is

really attacked, others are likely infected. After no more reactors are found, it may be assumed that this portion of the herd is free from tuberculosis and unless subjected to new infection will remain a healthy herd.

No animal, however, should be added to this herd from the outside without first going through quarantine. That is, when purchases from an outside source are made, such purchases, even if tested, should be separated for a time from the healthy herd until the test can be repeated. The same sire can be used on both the healthy and the infected herd if careful precautions are used and if he is not allowed to run with either of the herds, but it is entirely unsafe to bring animals from outside herds and put them at once into a healthy herd.

Treatment of the Infected Herd

In all cases, the first proceeding is to destroy all individuals that give external evidence of being in the last stages of the disease. Such animals are near the end of their usefulness and, being dangerous sources of wholesale infection, they should be destroyed at once.

The treatment of the remainder of the herd from now on should depend upon the value of the individuals and the purposes for which the animals are kept. If they are cheap animals and designed for meat, then the quicker they can be prepared for market and slaughtered where they may be inspected, the better and cheaper for all concerned.

If, however, they are dairy cows or valuable breeding animals, it is not only economically a crime but in every other way unfeasible and unnecessary to destroy these animals. In Denmark to-day, thirty per cent of the cows of the country are said to be tuberculous. In some other countries fifty percent are infected. Most of this infection is limited to certain small glands in the thoracic region. Such infection constitutes no immediate menace either to the health of the animal or that of the individuals consuming its products. Such animals should be isolated, but kept and used for commercial purposes, precautions being taken to maintain the best of sanitary conditions, especially as to sunlight and ventilation. As it is impossible to tell by the tuberculin test either the extent or the location of the disease, *all the milk from reacting cows is to be regarded as dangerous and should not be consumed until after it has been pasteurized or sterilized.*

Pasteurization consists in heating the milk in a discontinuous, or intermittent, pasteurizer, to a temperature of 140 degrees Fah-

renheit (60 degrees Centigrade), and maintaining this temperature for twenty minutes, or in a continuous pasteurizer to a temperature of 185 degrees Fahrenheit (85 degrees C.). Experiments all indicate that milk treated in this way may be fed with perfect safety.

As the bovine type of tuberculosis has been found in man, and especially in children, and as heating to high temperatures renders milk less desirable for infant feeding, it is highly advisable that infants be supplied milk from tested cows which have given negative results.

Milk from cows which have not been tested, and from reacting cows should be pasteurized before being used for making butter although it is mostly consumed by mature people. The pasteurization of skimmed milk and whey from all cooperative creameries and factories should be insisted upon, else the pigs and calves of the entire neighborhood will in time become infected. Over and over again this disease has been traced to the skimmed milk of creameries which is rendered dangerous by even a single case of open tuberculosis in one of the herds supplying the creamery.

If the animals of the infected herd are in any sense valuable as breeders, healthy calves may be raised, providing they are at birth promptly removed from the mothers and fed upon milk that is free from the living bacilli.

The only exception to this is that an occasional calf will be born with the disease, having contracted it from the uterus of the mother, and the only other trouble is that all calves should have a first feeding from the mother's milk on account of the colostrum. Most calves born with the disease will very quickly pass away, but the young stock should be subjected to the tuberculin test from time to time before it is added to the healthy herd.

By following this method, Dr. Bang has entirely replaced infected herds with healthy ones in the period of a very few years and at very slight expense. Under Dr. Russell's direction several Wisconsin men have done the same, and all experience indicates that these methods are entirely feasible for eradicating the disease from the farm.

If, as in rare cases, it is found upon the test that eighty per cent or more of the animals of the herd react, the whole herd may as well be considered as infected. In a case of this kind it is highly probable than even the non-reactors, like the others, have been repeatedly infected and have the disease in the incipient stage. Under these circumstances it may as well be considered a tuberculous herd and treated accordingly. If they are valuable pure bred animals they may be worth treating by the Bang method, even under these

extreme conditions. But if it is common stock, the usefulness of the herd is about over, at best, and it is in every way advisable to close out the herd at once by having them slaughtered under conditions where competent inspection is possible, for a large portion of the carcasses are fit for consumption as meat.

What Not to Do

One of the main causes of infection has been the dispersion sale of pure-bred animals. No man has a moral right nor should he have a legal right to disperse a herd affected with tuberculosis. Over and again the beginning of this disease in a neighborhood has been traced to one or two animals brought in from such sales for the sake of improvement. It is no secret now that a large portion of the famous animals offered at certain sales a quarter of a century ago were highly tuberculous. No animals should be offered for sale at a public auction without subjection to the tuberculin test and every animal that reacts should be kept upon the farm where it belongs, or sent to the slaughter house.

The wholesale destruction of all reacting animals is entirely unwarranted, both from the consideration of public and private interests. It is not feasible to destroy at once so large a fraction of our domestic animals. Neither is it necessary. The disease is slow in its progress and in the present state of knowledge its presence can be certainly ascertained. All that is called for is a sane but vigorous treatment of infected animals, clearly understanding that such animals under proper regulations can still be useful to their owners and to the public, except that, on the average, their lives will be shortened and their range of usefulness somewhat narrowed. The common practice of indiscriminate butchering in country slaughter houses, without inspection, and the feeding of offal to swine should be discontinued.

Vaccination

Vaccination for producing immunity in animals has been tried with some degree of success by experts, but the period of immunity is brief. This method of treatment cannot be recommended for general use and may even be dangerous in the hands of the ordinary farmer.

Intercommunication

The three best known types of tuberculosis—bovine, avian and human—are more or less distinct, and infection proceeds most readily within the species. There is good evidence upon this point. In the Island of Jersey, for example, bovine tuberculosis is almost

unknown, though human tuberculosis is common. Again, cattle inoculated with human tuberculosis contract a very mild type of local infection.

On the other hand, there is the best of evidence that these more or less distinct types do cross over under favorable conditions. The evidence on this point is as follows: first, the bovine type has been repeatedly found in man; second, human tuberculosis can be transmitted to cattle by inoculation though it produces a very weak form of the disease with very local disturbances, unless, according to Dr. Bang, the type transmitted from the human was originally the bovine form, in which case the inoculation is followed by more serious results.

The avian tuberculosis is a very marked variety, so marked that poultry may ordinarily be fed human sputum or large portions of tuberculous matter of cattle without contracting tuberculosis. However, Dr. Bang's son last summer succeeded not only in so modifying the tubercle bacilli of mammals by their passage through poultry as to cause them to behave like the avian form, but he also succeeded in transmitting avian tuberculosis in the fatal form to young goats, calves, and colts by inoculation from poultry, though the inoculation failed utterly in mature horses, one of which was the dam of the foal which died in fifty-five days after inoculation.

All experiments indicate that the young are especially susceptible to this disease and it is in the young that the different types may be crossed over, all of which indicates the very great care which should be exercised in providing milk for infants, calves and pigs.

Tuberculosis in Illinois

The presence of this disease in the State to a slight extent has long been known. The attention of the University was first attracted to the situation by a purchase of cows for experimental purposes, more than half of which were found infected with tuberculosis. The extent to which it exists within the state is of course unknown, but its prevalence in certain localities calls for prompt and vigorous action.

What Illinois Should Do

Conditions call for action in two directions. The individual stockman should clean up his premises from this disease as he would from any other dangerous menace to his business. Second, the statutes of Illinois are silent upon this important subject. The time has come when proper legislation should be enacted so that, in the interests of the public, this disease can be controlled.

If this is done from the standpoint of animal interests alone, considerations of public health will be safeguarded, and if it is not done from the standpoint of animal interests, action will shortly be forced by considerations of human health.

The Indemnity Feature

The widespread prevalence of this disease among the herds of a state is a public as well as a private misfortune. It is a condition for which the individual stockman is not responsible. In the interests of the public as well as his own he should clean up. This will require the absolute sacrifice of some animals, and limitation in the usefulness of others. So far as he is obliged to sacrifice animals absolutely for his own as well as the public interests, he should be indemnified for a portion of their reasonable value as representing the public interest in his activity to clean his premises. All authorities regard the indemnity feature as imperative in anything like a public attempt to control this disease.

The Appointment of a Committee

The Convention closed with the appointment of a Committee representing the University, as an educational institution, the Live Stock Sanitary Commission, as the administrative arm of the state in matters of this sort, and the various live stock interests. The Committe is as follows:

E. Davenport, Director of the Experiment Station, Chairman.

P. S. Haner, Taylorville, Chairman of Ill. Board of Live Stock Commissioners.

L. N. Wiggins, Springfield, Pres. Ill. Dairymen's Ass'n.

A. P. Grout, Winchester, Pres. Ill. Live Stock Breeders' Ass'n.

A. O. Auten, Jerseyville, Pres. Ill. Dairy Cattle Improvement Association.

Eugene Funk, Shirley, representing the cattle feeding interests.

J. P. Mason, Elgin, Pres. Ill. State Farmers' Institute.

The University Herds

While the University has conducted no general experiments in tuberculosis, it has always done what all good stockmen have done since the origin of the tuberculin test, and has subjected its herds to frequent inoculations. This has been done for more than a dozen

years. As is commonly the case in herds where animals have been brought in from time to time, nearly every test has discovered a few cases of tuberculosis. The disease, however, has not been an issue in this herd and until recently experience in the University herd was not different from that of other and similar herds everywhere. The same is true yet as to the beef herd, but about a year ago it was necessary to secure a considerable number of common cows, such as are used in the commercial dairies of the state, for experimental purposes. These were tested, and, as has been before remarked, more than half were found to be tuberculous. One of them was evidently in the advanced stages of the disease,—too far advanced to react to the test,—and this individual has been responsible for a spread of the infection, until today a portion of one of the breeding herds is infected. This herd is being treated by the Bang method, exactly as advocated by the best authorities, in order to secure the young for addition to the clean herd, and finally to restore a healthy condition throughout the entire herd.

The University invites inspection of the progress of this work from time to time, although it cannot admit visitors freely to the infected herd on account of the danger of carrying the infection back and forth over the yards, but it will be glad to explain the method of procedure and to show it as much as possible to all who are interested. The University will also be glad to assist others in proceeding with the same method in the case of valuable animals that may have become infected.

Sanity Not Insanity

In the handling of this matter of tuberculosis, conditions call for the most sane procedures. It is a serious and dangerous disease which any stockman is likely to get into his herd; indeed, it is a disease that most stockmen by purchase some time in their experience get into their herd. It is a disease which should be handled without gloves. On the other hand, it is not sudden and sweeping in its effects and plenty of time is available for handling it in a way that shall not destroy nor even to any great extent injure the value of animals to their owners. The greatest danger lies in either one or the other of the two extremes; sweeping destruction of all infected animals on the one hand, or doing nothing upon the other. Neither course is sane. Neither course is safe. The middle course is both sane and safe; namely, that all infected animals should be segregated and their products used under such conditions as shall insure

their safety not only to human beings but to all animals as well; and last of all, that all advanced cases of the disease, and *these only*, should be at once destroyed.

Sanitary Conditions

While it is true that neither darkness nor dampness, lack of exercise nor poor ventilation are sufficient to originate tuberculosis, it is also true that when the germ is once introduced these conditions are favorable to the rapid progress of the disease, as is the generally weakened condition of the animals resulting from close confinement in poorly ventilated buildings. Cattle are naturally accustomed to an active outdoor life and from the point of health they should be kept out of doors as much as possible, and in bank barns as little as possible.

Copies of the addresses and the discussions can be had upon application to the Agricultural Experiment Station, Urbana, Illinois, and information concerning the application of the test may be had from the Board of Live Stock Commissioners, Springfield, Illinois.